TECHNICAL WORKSHOP

"INTEGRATING COMMON PROBLEMS FOR SHARED SOLUTIONS"

Project Area #7 – INEGI, ISQ

POLYMER CONCRETES

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Organized by C3P
IST, Lisbon
19 September 2003

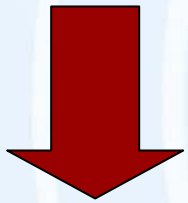
Outline

1. PURPOSE OF THE STUDY
2. The problem
3. The solution
4. Advantages
5. Polymer concrete
6. Tasks
7. Funding

1. Purpose of the project

-RECYCLING OF FOUNDRY SANDS

-DEVELOPMENT OF NEW POLYMER CONCRETES WITH FOUNDRY SANDS



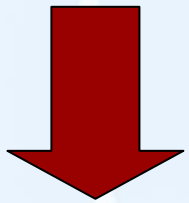
- SOLVE A PROBLEM OF FOUNDRY COMPANIES IN TERMS OF POLLUTION LEGISLATION
- CREATION OF A NEW ADDED-VALUE MATERIAL
- REDUCTION OF COST FOR POLYMER CONCRETES
- CREATION OF A NICHE-MARKET

2. The problem

- ***In 2002, 1300 tons of foundry sands*** were produced by national foundries.
- ***Resin-rich foundry sands*** are toxic materials that pollute the environment
- ***The high stock of such materials*** does not allow the re-use of the totality of stock again in foundry
- ***Other applications other than foundry*** are necessary.
- ***Foundry companies have very high costs*** to eliminate resin-rich sands. In particular, most of them are exported.

3. A solution

Recycling of foundry sands as aggregates for polymer concretes and polymer mortars; (asphalts ?)



Development of new products for the construction and public works industries

4. Advantages

- **For foundries**
  - Low-cost way of elimination of polluted foundry sands (solid waste)
  - Low-cost recycling method
- **For polymer concrete companies**
  - Low-cost raw materials
  - Lower porosity due to the compatibility of aggregate interface with resin matrix
- **For the environment**
  - Reduction of solid waste materials deposited in landfills
  - Reduction of risk materials in open air or near to water sources
  - Recycling of materials in a safe final product

5. Polymer concrete

Polymer Concrete is made from thermoset resins, such as polyester or epoxy resins, and natural (or recycled) aggregates.

- High compressive strength
- Good chemical resistance
- Low cure time

5. Polymer concrete

- Materials

Polymer concrete:

Epoxy Resin	+	Foundry Sand
• Low Viscosity		• Fine Grain • D_{50} = 342

σ_c = 82 MPa E = 11 GPa

6. Typical applications

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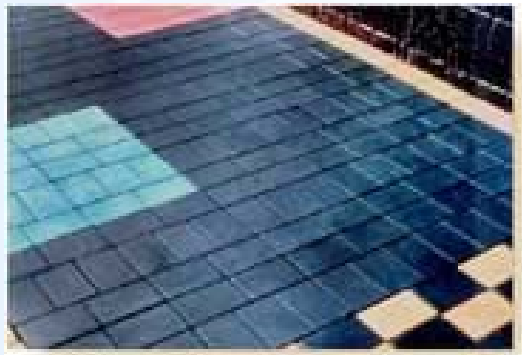
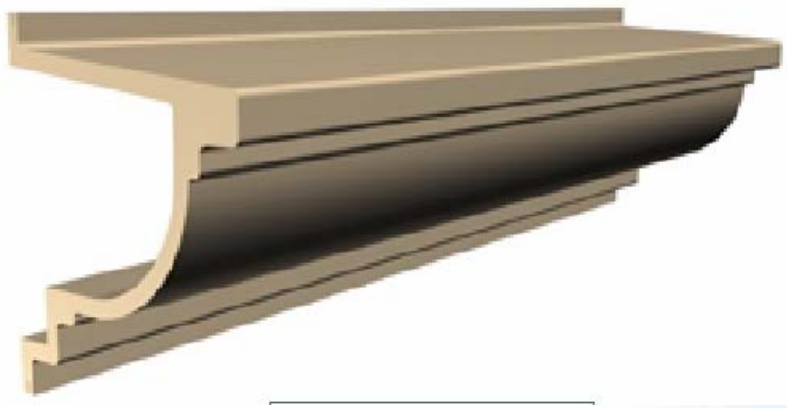


6. Typical applications

Figure 3 – Level crossing panel being load tested

6. Typical applications



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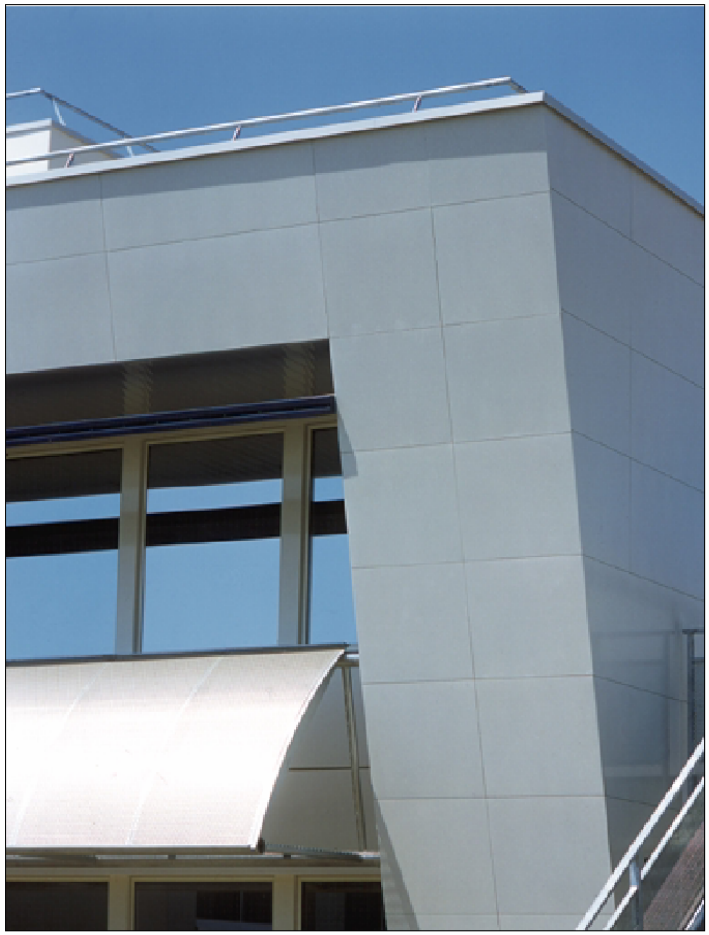

6. Typical applications

7. Tasks

- Selection of materials
- recycling methods
- development of new polymer concretes
- characterization of materials
- production and testing of lab and real-scale prototypes

8. Funding

- Foundation of Science and Technology (FCT)
- Innovation Agency (AdI)
- Economic Operational Programme (POE)
- European Commission: 6th Framework

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